Applicant respectfully points out that feature "selectively depositing solder only on the exposed portion of the metal contact without depositing solder on the insulating layer" of claims 1, 9, and 11 is supported in the text, for example, see page 10 lines 15-27. This feature is also supported in the drawings, for example, see FIG. 5A and FIG. 5B. These figures clearly show that solder 200 is deposited only on the exposed portion of the metal contact 150 and not on insulating layer 160.

§103 Rejection of the Claims

Claims 1, 3-12, 64, 65, 68, and 71 were rejected under 35 USC § 103(a) as being unpatentable over Cook et al. (U.S. 5,457,345) and in further view of Thomas (U.S. 4,661,375) and Strube et al. (US 4,650,548).

Analysis of the Cook et al. Patent

In the Cook et al. patent, the described prior art used a removable metal (molybdenum) mask to prevent solder from being applied to anywhere but the pads. However, the molybdenum mask limited the size of solder pads to be 100 microns or more (see column 2, lines 10-16). To make smaller pads, a photoresist lift-off mask is used to define a removable mask (column 2, lines 21-25). To remove the mask, process chemicals such as perchlorethylene or other chlorine chemicals are used to strip the photoresist mask after the solder is applied to the pad. Cook et al. determined that the existing metallurgy of the pad was damaged by the exposure to chlorine (see column 2, lines 55-57). So Cook et al. constructed a new metallurgy for the pad to resist the chlorine damage (column 2, lines 50-55). Cook et al. did not use selective deposition of solder and did use a removable mask.

Analysis of the Thomas Patent

In the Thomas patent, an implication is made that one could form a C4 joint without the use of a mask. Thomas states "Besides eliminating the photomasking operations involved in vacuum evaporation and electroplating, a solder reflow step is not required to spheridize the bumps 10-10." (See column 3, lines 63-66). Thomas does not explicitly state that the initial

solder ball is formed without a mask. Thomas merely states that one starts with a solder ball and builds it up in height by successive immersions in solder baths having differing ratios of Pb and Sn.

Analysis of the Strube et al. Patent

The Strube et al. patent describes electrolytic build-up of solder on a printed circuit board. A "galvano resist" pattern is used as a mask which is then stripped off after deposition. (See Figure 1 and see step 8 in column 2, line 26 and step 8 in column 2, line 62.) This is not a selective deposition.

Analysis of the Combination of the Patents

The Cook et al. patent describes depositing the solder by evaporation and with a mask. The Examiner relies of the statement in Cook et al. that the solder contact could be formed by "other suitable means." This type of generalized statement is often included in patent applications in an attempt to broaden the possible equivalents for elements in the claims. In this use, the phrase "other suitable means" has no other support or description in the Cook et al. patent. Hence, there is no teaching as to what would or would not be a suitable means. There must be some reasonable limit to the equivalent means but we are left to guess what that is.

The Thomas patent is combined with the Cook et al. patent to provide immersion as an "other suitable means" for depositing solder. However, Cook et al. uses removable masks and evaporation for the deposition. Thomas et al. uses immersion for the deposition. The claims of the present patent application recite that no removable mask is used and we do not claim immersion as a deposition means.

The Strube et al. patent is combined with the Cook et al patent to provide electrolytic deposition as an "other suitable means" for depositing solder. However, both Cook et al. and Strube et al. use removable masks. The claims of the present patent application recite that no removable mask is used.

Applicant's Response to the Examiner's response to Arguments

In the office action mailed August 27, 2002, page 5 states that "in the art selective deposition does include using a mask". This is in contrast with the claims of the present invention. The claims of the present invention recite that no removable mask is used.

Page 5 also states that "Thomas reference disclose immersion, which does not using a mask in the specification or the drawings". However, the claims of the invention do not recite immersion as a deposition mean.

Page 5 further states that "the Examiner sees no difference between electrolytic and selective electrolytic deposition, in view of the specification, and therefore hold that it is inherent that the processes are equivalent and read on the claimed invention". Applicant treats this statement as the Examiner's comparison between the electrolytic deposition of Strube et al. and the selective electrolytic deposition of the present invention. Therefore, Applicant points out again that electrolytic deposition of Strube et al. uses a removable masks, see Strube et al. FIG. 1 and step 8 in column 2, line 26 and line 62. The claims of the present invention recite that no removable mask is used.

In light of all of the analyses and the Applicant's response to the Examiner's response to Arguments above, Applicant believes that the claims of the present patent application are patentable over Cook et al., and in further view of Thomas, and Strube et al. Accordingly, Applicant requests reconsideration and withdrawal the rejections of claims 1, 3-12, 64, 65, 68, and 71 and that these claims be allowed.

Conclusion

Applicant respectfully submits that the claims are in condition for allowance and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's representative (612- 373-6969) to facilitate prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

Respectfully submitted,

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Date 11.18.02 By _____

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CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail, in an envelope addressed to: Commissioner of Patents, Washington, D.C. 20231, on this 18th day of November, 2002.

Name Amy Moriarty

Signature _____